CREATING A TWO DIMENSIONAL MODEL OF THE EARTH'S ATMOSPHERE USING SHALLOW WATER EQUATIONS,

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The Shallow Water Equations are a set of partial differential equations used to simulate wave propagation when the horizontal dimensions are of much greater magnitude than the depth. This allows for the simulation of several different types of waves; most commonly atmospheric or oceanographic. The long term goal of this research is to simulate the propagation of pollution from automotive exhaust. In the context of this project, atmospheric waves were used to create a two-dimensional model of the atmosphere that can solve the Shallow Water Equations on the surface of the entire globe, and across discontinuities. This research examines usage of Lax-Wendroff and WENO schemes to solve the equations in Cartesian Coordinates. The pragmatism of the solution is maximized through examination of proper methods and gridding techniques for solutions in spherical geometry, such as the cubed sphere, for an arbitrary case.

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